NERRS Science Collaborative Progress Report for the Period September 1, 2013 through February 28, 2014

Our Coast–Our Future: Planning for Sea Level Rise and Storm Hazards in the San Francisco Bay Area

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Report compiled by: Kelley Higgason

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A. **Progress overview: State the overall goal of your project, and briefly summarize in one or two paragraphs, what you planned to accomplish during this period and your progress on tasks for this reporting period. This overview will be made public for all reports, including confidential submissions.**

The ultimate goal of the Our Coast–Our Future (OCOF) project is to provide the tools and information needed for local decision-makers to utilize the best available science to inform planning processes such as climate change adaptation, restoration, and management plans, and Local Coastal Plans, and take actions to ensure healthy, viable, and sustainable coastal ecosystems and communities. We will accomplish this goal by producing science-based, online decision-support tools to help San Francisco Bay Area coastal resource and land use managers and planners understand, visualize, and anticipate vulnerabilities to sea level rise and storms within the bay and on the outer coast from Half Moon Bay to Bodega Bay. The support tools are being built in collaboration with end users. A fine scale resolution (2 meter) Digital Elevation Model for both the North-central California coast and San Francisco Bay has been recently completed, and localized sea level rise and storm scenarios are currently being developed to underlie the tool. This project builds on a related effort on the North-central California outer coast (referred to hereafter as "Outer Coast"), and the resulting tools will ultimately be available for the shoreline of the entire 9-county San Francisco Bay Area (except for portions of the Sonoma and San Mateo County outer coastlines), with the Outer Coast portion made publically available in February 2013.

During this reporting period, the team has: held 4 project team meetings and 1 meeting with the project Advisory Committee; updated the OCOF website to include a "Get Started" page; developed a partnership with the California King Tides Initiative to help validate flood scenarios using crowdsourced King Tide photos as well as use OCOF data to create a "Sea Levels in My Lifetime" pop up exhibit at the Exploratorium; organized and held a session at the Social Coast Forum on the role of tools in the adaptation planning process; received approval of award for a proposal with Marin County to provide technical assistance for a sea level rise vulnerability assessment and adaptation plan for the county; submitted a proposal to the NOAA Climate Program Office to use OCOF data as part of quantifying the ecosystem services tidal marsh systems provide human communities within the San Francisco Estuary; held a directed training and discussion on the local applicability of the OCOF tools with California Coastal

Commission staff; provided more than 10 formal or informal demonstrations of the Outer Coast online tools; provided a webinar to the USGS Coastal Marine and Geology Program at Woods Hole on CoSMoS and the technologies behind the OCOF web application identified 5 potential technical assistance projects and held various project scoping meetings; participated in a scoping meeting with the NOAA Habitat Blueprint team for the Russian River Watershed and Sonoma County to potentially expand OCOF to cover the entire County outer coastline and the mouth of the Russian River Watershed, and was subsequently invited to partner on a Habitat Blueprint proposal; initiated user interviews to evaluate the OCOF tools (developed interview protocol, selected users to request interview, scheduled and held 5 interviews); continued to synthesize and process feedback received from stakeholders; presented the project at several professional conferences and meetings; and interfaced with expert peers.

B.   Working with Intended Users:

Describe the progress on tasks related to the integration of intended users into the project for this reporting period.

During this reporting period, the team held one formal and several informal information exchanges with the OCOF Advisory Committee (our main vehicle for intended user collaboration) as a group and individually. During the September 2013 Advisory Committee meeting, the final list of nested grids, or areas of high resolution, for the San Francisco Bay model was presented (Figure 1). All of the Advisory Committee recommendations were included except those where the grid would not have resulted in substantially better predictions, and there were no objections from the Advisory Committee. At the Advisory Committee meeting, we also discussed Advisory Committee members' concerns with the DEM – specifically areas of poor coverage and levees. Questions came up about the DEM date, and which levees would actually be captured on the DEM (for example, Foster City and Mission Bay levees are not included in the 2010 DEM). The OCOF team is discussing how best to include additional information on possible limitations of the DEM, such as adding information to the FAQ or including a map layer with date information. In addition, Advisory Committee member Kris May provided an update on FEMA flood maps and other relevant AECOM projects in the Bay Area.

Whereas most of the Bay model will make explicit predictions every few hundred meters, in areas with nested grids, projections are made on an approximate ~20 meter scale. USGS is incorporating identified sites of interest by grouping them into 12 sites of up to 10 km in size. These sites include (Figure 1):

- Coyote Creek / Alviso
- East Palo Alto
- Oakland airport
- Foster City
- Hayward shoreline / Oakland airport
- Embarcadero, near Howard, ballpark – Pier 54/Mission Bay
- Richardson Bay near 101, Tam Junction, Marin City
- Corte Madera
- China Camp
- Petaluma River
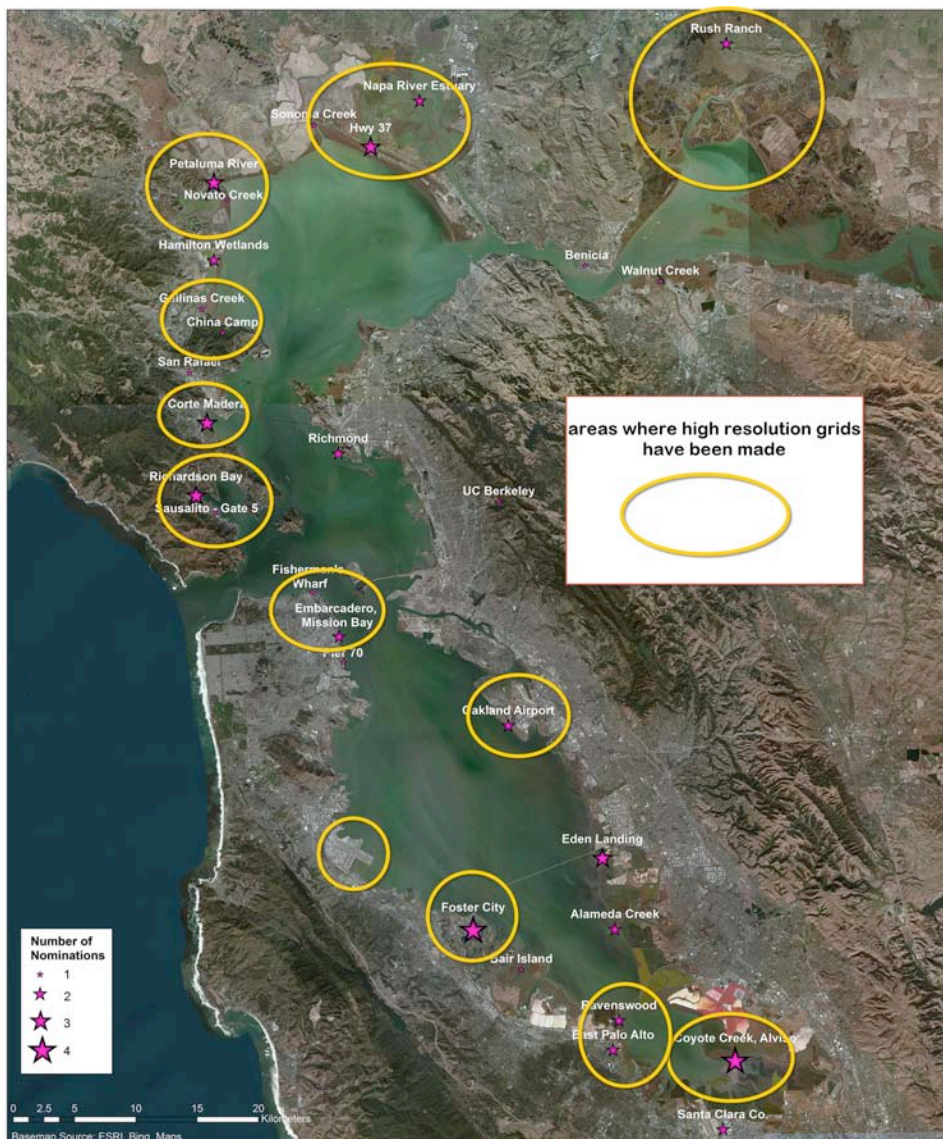- Highway 37
- Napa River estuary
- Rush Ranch

Figure 1. Regions within San Francisco Bay where high – resolution grids (~20m) have been developed. Starred sites nominated by the OCOF Advisory Committee; yellow circled sites are those that are being incorporated on a high-resolution scale into the model.

Additionally at this meeting, we presented the four types of technical assistance identified through stakeholder outreach, as well as a table outlining potential technical assistance throughout the region identified as of September 2013 (Table 1):

1. Targeted Trainings: to agency staff on how to use SLR decision support tools in general, and specifically OCOF.
2. Integration Support: for organizations that want to bring OCOF's SLR scenarios into their own GIS environment or decision support tool.
3. Technical Assistance Engagement: for organizations that want to use OCOF in a planning process and need assistance with scenario planning, tool modification or application, etc.
4. Additional resources: In addition to the tool itself, OCOF staff have always intended to include resources such as FAQs, case studies, peer-to-peer learning, and other

Table 1: Potential technical assistance. September 2013.

Organization	Type of Assistance
BCDC	Targeted Training
South Bay Salt Ponds Restoration Project	Technical Assistance Engagement
Sonoma Land Trust	Technical Assistance Engagement
ESA/PWA	TBD
Marin County	Technical Assistance Engagement
AECOM	Integration Support
NOAA CSC	Possible comparison of Viewer and OCOF outputs
SF Bay Joint Venture	Targeted Training
CA Coastal Conservancy	Targeted Training
Metropolitan Transportation Commission and Association of Bay Area Governments	Targeted Training
Port of San Francisco	Targeted Training
SF Bay NERR	Technical Assistance Engagement
Silicon Valley 2.0	Integration Support
San Mateo County San Pablo Bay NWR	TBD

In addition to one formal Advisory Committee meeting, numerous planning calls and meetings were continued with Advisory Committee members and other partners to help finalize the projects we would provide technical assistance to. The current list of projects includes:

- San Francisco Bay NERR and California State Parks: two planning meetings and one site visit to China Camp State Park have been held to scope a project that will evaluate three potential restoration options to restore hydrological connectivity to muted marsh areas currently cut off by a county road using OCOF SLR/storm scenarios; restoration options that OCOF will produce new model scenarios for include: keeping the road ("as is" option, already included in SF Bay model), removing the road in key areas and replacing with causeways, and widening the existing culverts; for options two and three, a new model will be developed and 2-3 SLR/storm scenarios will be evaluated for each option; we are also partnering with San Francisco State University and NOAA Coastal Services Center to develop a socioeconomic report evaluating each option; products to be completed by August 2014 include: additional model scenarios; case study for the OCOF website with a static map; analyses the NERR could use in a proposal or work plan, including next steps, timeframe, ideas for how this could be moved forward (similar to a Needs Assessment of what data exists, what other data would be needed); case study for the CSC economic framework guidebook; and habitat sustainability models. See Figures 2 and 3.

- Silicon Valley 2.0: led by AECOM, this project is developing a climate vulnerability assessment and adaptation plan for Santa Clara County, including analyzing replacement costs for a wide variety of infrastructure and estimates of human population impacts. They are using the OCOF scenarios for their sea level rise and storm surge climate variables. As part of this project, they are building a web application that makes their climate adaptation plan data available online and in an interactive form for Santa Clara county and local municipal staff.
- Sonoma Land Trust: an initial scoping meeting was held and it was determined that OCOF data would be useful in helping to inform land acquisition assessments, and the Port of Sonoma was identified as an immediate focal area; Point Blue will be running preliminary marsh accretion and conservation rank reports, and once the OCOF scenarios are available in the spring, Point Blue will produce OCOF visualizations for this area prior to the online tool being available.
- Marin County Sea Level Rise Study: proposal to develop a vulnerability assessment and subsequent adaptation plan was accepted, the OCOF team is partnering on the vulnerability assessment beginning this spring and continuing through 2015.
- Gulf of the Farallones National Marine Sanctuary (GFNMS) Focal Resources Vulnerability Assessment: GFNMS is currently finalizing through stakeholder engagement, a set of focal resources (habitats, species, and ecosystem services) to assess their vulnerability to climate change; where needed, OCOF data will be utilized and the team will be consulted for these assessments; GFNMS will work with local stakeholders to develop a climate adaptation plan based on the vulnerability assessment

Figure 2: China Camp State Park, gathered east of Turtle Back Hill for an overview of the site.
Figure 3: China Camp State Park, viewing Back Ranch Meadows.

We also provided a project overview and demonstration of the Outer Coast decision support tool to the Sonoma County Water District and Planning Department. In addition, we organized a directed training for California Coast Commission staff that consisted of: background presentations on the overall OCOF project and CoSMoS; live demonstration of OCOF tools suited to staff's interest; and a discussion including: how CCC staff has utilized the mapping tool thus far and feedback on their user experience; suggestions for future updates to the current North-central CA coast mapping tool; how can the mapping tool best be developed to support planning within San Francisco Bay; whether there were additional planning resources that should be included as part of the OCOF website; and how the OCOF tools can best support the CCC Sea Level Rise Policy Guidance. We also presented to the USGS Coastal Marine and Geology Program staff in Woods Hole, MA via webinar the technical details about CoSMoS and our approach to building the OCOF web application.

Representatives from the OCOF team participated in a scoping meeting in February 2014 with the NOAA Habitat Blueprint team for the Russian River Watershed and the Sonoma County Water District and Planning Department to potentially expand OCOF to cover the entire outer coastline of the county, including the mouth of the Russian River Watershed. Currently the Bay shoreline of the county will be covered with the OCOF SF Bay release this summer, but the outer coastline is only covered to Bodega Bay. Sonoma County recently received funding through the California Ocean Protection Council to update their Local Coastal Plan for sea level rise and storm hazards. It was determined at this scoping meeting that OCOF expansion would be beneficial to their planning needs and they would like to utilize OCOF scenarios and visualizations for their vulnerability assessment and public outreach. OCOF has now been invited to partner on an RFP with the Habitat Blueprint team that is specific to funding projects within the national Habitat Focus Areas and we are currently developing the budget and language for this.

In preparation for the SF Bay launch and to follow up on one year of availability of the Outer Coast tools, we felt it was important to survey users through a brief interview to evaluate their experience navigating the tools, how they have applied them to their work, what decisions were made as a result, and what suggestions they have for future updates to data, features, and functionality. We developed a semi-structured interview protocol, selected users to request an interview of based on frequency of mapping tool use and affiliation, and scheduled and held 5 interviews during the last week of February 2014. We will report on the synthesis of these interviews and appropriate case studies that are developed as a result of them in our final project report.

Lastly, for a broader audience, OCOF data was used to create a "Sea Levels in My Lifetime" pop up exhibit at the Exploratorium with the King Tides Initiative. The pop up was a photo booth, and museum attendees were invited to explore how high seas were predicted to rise in their lifetimes. Approximately 5,000 people were in attendance at the museum that evening. OCOF was also presented at Oakland Museum of California as part of their Friday night programming.

What did you learn? Have there been any unanticipated challenges or opportunities?
Timing is crucial. As we continue to provide technical assistance to real-world projects that need to understand risks associated with sea level rise and storm hazards, the OCOF team and intended users have realized how critical having the right information, in the right format, at the right time can be. Several of the projects that we had originally considered prime candidates for OCOF end use are actually not able to apply the tool to their planning process during the period of this grant due to unexpected delays or other alterations to their existing workflows. At the same time, we have identified a number of other potential projects and partners that we hadn't been aware of at the time of our grant writing.

In addition, a new challenge is arising with the plethora of sea level rise guidance, tools, and models in development across the state: decision-makers struggle to understand how to utilize these tools and models in various planning frameworks; to recognize their differences and similarities; and decide which tool to utilize in their own adaptation planning effort. As the issue of sea level rise is addressed more frequently in public discourse, a clear, concise, and consistent message to the media, local elected officials, and the public becomes more important. To turn this challenge into an opportunity, OCOF's Project Coordinator and Collaboration Lead are partnering with the NOAA Coastal Services Center, the San Francisco Bay National Estuarine Research Reserve, the Tijuana River NERR, and The Nature Conservancy to convene a targeted group of sea level rise and shoreline change modelers and tool developers in a facilitated process to collaborate on delivery and communication of these products.

Planning for this meeting has been ongoing since December 2013 and the two NERR teams have submitted a Science Collaborative Transfer Grant proposal to support the work described below.

In June 2014, we plan to bring these model and tool development teams together to discuss the relationship between functionalities of the tools, their specific application in various planning processes, and how they will be (or are being) communicated to end-users and decision-makers. The Nature Conservancy's model and tool comparison matrices, which are currently in development in collaboration with NOAA and Climate Central, will provide the foundation for discussions.

At the meeting, a joint strategy will be generated to ensure that future communication of the various tools and models is clear, accurate, and useful to intended users (i.e., will provide clarity on tool application). The result will be shared with decision-makers and coastal managers statewide at the California Adaptation Forum in August 2014 as part of a special session to engage attendees with the models and tools available across the state. The power and value of the session will be in the representation of each of the robust, high visibility tools collectively sharing a clear message to end users. Attendees will learn to better interface with stakeholders about utilizing tools and interpreting results.

Who has been involved?
The entire team has been involved in various outreach, integration, and technical assistance activities.

Has interaction with intended users brought about any changes to your methods for integration of intended users, the intended users involved, or your project objectives?
We designed a collaborative process that requires input at several key points in the project in order to move forward. During this reporting period, we have not encountered any unanticipated "changes" to our methods or objectives as a result of our interactions with intended users, but we have reached several collaborative decision points, which help to ensure that we build a product that our intended users find useful. In this reporting period, those decision points have focused on the types of training and technical assistance needed by each of our Advisory Committee members (see Table 1 for details), as well as feedback from interviews with end users.

How do you anticipate working with intended users in the next six months?
In the next six months, we will continue to work with our Advisory Committee on decisions related to DST functionality, especially as related to user interface considerations, and will convene them to beta test the SF Bay flood mapping tool. We will incorporate their feedback and will make improvements to our design based on this. We will continue to work with our technical assistance projects in either scoping or implementing these projects. We will develop case studies from our technical assistance projects and user interviews and incorporate those into the OCOF website. We will continue to provide demonstrations and directed trainings for the Outer Coast decision support tools, with directed trainings targeted for Marin and Sonoma County staff. We will also schedule directed trainings to occur once the SF Bay flood map is also available for key stakeholders within San Francisco Bay such as the Bay Conservation and Development Commission, Port of San Francisco, SF Bay Joint Venture, and Metropolitan Transportation Commission. We will deliver modeling results as soon as they are available to projects that are awaiting those results, such as Silicon Valley 2.0, and will work with project staff through any specific technical issues, and validate the results in their specific areas of focus. We will provide online webinar trainings to a wider audience of practitioners highlighting the SF Bay flood map and updates that have been made to the OCOF tools and website as part of the SF Bay launch.

C. Progress on project objectives for this reporting period:

Describe progress on tasks related to project objectives for this reporting period.

Hold Project Team meetings: Proceeded as planned. Team meetings were held on September 10, November 13, and December 17, 2013, and January 23, 2014.

September 10, 2013 – Discussed final SF Bay nested grids and questions that have come up regarding the possibility of running model without barriers such as a particular road, USGS would have to tweak the DEM and rerun scenarios, this can be done on a "case study" basis for SF Bay NERR; potential project expansion to new geographic areas; the potential of doing a technical comparison of OCOF and the NOAA SLR Viewer; technical assistance projects; and upcoming September Advisory Committee meeting.

November 13, 2013 – Discussed SF Bay modeling and tool development; ongoing project expansion and technical assistance discussions; debriefed on September Advisory Committee meeting and planned for January meeting.

December 17, 2013 – Discussed SF Bay modeling and tool development; ongoing project expansion and technical assistance discussions; debriefed on numerous regional meetings team members participated in and planned for upcoming conferences.

January 23, 2014 – Discussed scoping meeting with Sonoma County and Habitat Blueprint for Sonoma coast expansion; discussed the status of SF Bay scenarios, including the incorporation of king tide scenarios; debriefed on numerous regional meetings team members participated in and planned for upcoming conferences; planned for Coastal Commission directed training; discussed website updates including the addition of a "Get Started" page; determined the next Advisory Committee meeting will be held in early May to beta test the SF Bay mapping tool

Hold San Francisco Bay Advisory Committee meetings: Modification made. One of two planned Advisory Committee meetings was held on September 17, 2013. See above for meeting details. Feedback about the content and format of meetings has so far been very positive. The scheduled January meeting was not held because team members determined it would be most effective to wait until the prototype SF Bay tools were developed and solicit member feedback on them.

Produce the San Francisco Bay Digital Elevation Model (DEM): Modification made to public release. USGS Earth Resources Observation and Science (EROS) Data Center completed the Digital Elevation Model (DEM) for the entire San Francisco Bay area using all recently collected multibeam bathymetry and topographic LiDAR. The DEM is available for public download (http://pubs.usgs.gov/ds/684/ and http://toptoools.cr.usgs.gov/topobathy_viewer/): "A seamless, high-resolution digital elevation model (DEM) of the north-central California coast", 2012, Foxgrover, Amy C., Barnard, Patrick L., USGS Data Series: 684.

Predict physical climate change impacts from scenarios: Proceeded as planned. USGS constructed a framework for high spatial resolution modeling specific to San Francisco Bay; framework consists of an outer coarse model, nested models, and a suite of matlab codes that allow communication between runs and input/output file management as well as post processing for import to ESRI ArcMap GIS software. Algorithms for automated import and generation of shape (.shp) file flood maps have been

completed. We completed model sensitivity testing of wave current interactions, swell penetration and contributions to wave setup within the Bay, wave generation limits with respect to depth changes, bed roughness parameters, and changes in tidal regimes with anticipated sea level rise. Generated time and space varying pressure and wind fields for hind-cast and future time periods, including application of the technique developed earlier in this study for temporal downscaling of mean daily future winds. We developed a scheme for projecting and including fluvial inputs from nine tributaries (and the Delta) into the model using quantile corrections and identification of storm patterns. Calibrated and validated modeled water levels against astronomic tidal constituents and measurements of high water levels during two storm events in 2010 and 2011. We completed estimation of vertical land movement rates from tectonic and human-influenced activities (Roland Burgmann, U.C. Berkeley) as well as marsh sedimentation rates (Sam Veloz, Point Blue); these are being incorporated into the flood uncertainty maps. Completed full 100-year WaveWatchIII runs for determination of ocean swell contributions. Similarly, the full time-series has been run on a coarse grid with spatially variable wind forcing across the Bay for the purpose of identifying storm events. Simulations of King Tides (December 2013 and January 2014) have been run and continue to be used for quality assurance with respect to flooding and levee positions. Fine-tuning of levee and engineered mound elevations within some of the high resolution grids is ongoing. Currently we are in "production mode" running the outer models under various sea level rise scenarios, fine-tuning the model topography for the highly resolved areas, and fine-tuning scripts for data delivery. We developed methods for integrating models of marsh accretion to the base DEM to allow for estimates of uncertainty in flood extent and depth that account for tidal marsh habitat evolution in the future.

Develop flexible framework for web-based DST; revise as needed: Proceeded as planned. We received feedback from users that they have experienced some confusion about how to get started with the DST, and what steps to take to use it most effectively. In response, we created a "Get Started" guide that provides a 5-step approach to using our tool. Moving forward, we will monitor use of this page to get a sense of how many users utilize this approach to learning. We began investigating applying new technologies used in web delivery of climate scenario modeling results (THREDDS, OpenDAP and NetCDF) to see if we can boost performance and make querying of modeling results more efficient. We continued to solicit feedback from the Advisory Committee, as well as through demos and directed trainings, in order to improve the map interface and overall usability of the decision support tools as needed.

Coordinate with relevant national, state and local efforts: Proceeded as planned. Through a NSC "transfer" project, we were able to link this project with similar work being conducted in San Diego through the CURRV project. Staff from CURRV and OCOF projects were able to share information and resources, and although the transfer grant itself has ended, transfer activities continue.

Based on our work on the Outer Coast, as well as the developing work in SF Bay funded here by the NSC, new funding has been secured by the State Coastal Conservancy and others for the USGS to apply a similar methodology to the entire Southern California coastline. This effort will also include long-term projections of coastal change in the flooding analysis. The project is scheduled to start later in calendar year 2014.

What data did you collect?
- USGS stream gauge data (all available data for Corte Madera, Sonoma, San Francisquito, Petaluma, Napa, Old Mill Creek, Coyote Creek, Guadalupe River)

- Delta outflow rates for the 21st century under the assumption of the medium emissions scenario B1 (USGS CASCADE project)
- Water level measurements and astronomic constituent amplitudes and phases of at the Alameda, Ft. Point, Mare Island, Port Chicago, Redwood City, and Richmond tide stations
- Vertical datum offsets (MSL, NAVD88, MHHW) at the same tide stations and Coyote Creek using estimates from VDATUM and spatially interpolated VDATUM results through entire Bay
- Updates on levee positions in Foster City (contact Kris Mae, AECOM) and Suisun Bay
- Time and space varying winds and sea level pressures derived from the GFDL global climate model, versions AR3 and AR4, scenarios
- Water level and barometric pressure measurements at 34 sites throughout the Bay for two storms in 2010 and 2011 (source: Karen Thorne, USGS)
- Wave data within San Pablo Bay (source: Jessica Lacy, USGS)
- Adapted high and low estimates of marsh accretion at each 25cm sea level rise increment from models based on Army Corps of Engineers sea level rise curves.
- The OCOF team also partnered with the California King Tides Initiative to help validate OCOF flood scenarios for SF Bay using crowdsourced King Tide photos the following announcement was featured on the King Tides Initiative website and other forms of social media:
  - **Do It for Science!** Want to help us understand flood risks in the Bay Area? CKTI is partnering with USGS and the Our Coast, Our Future project to collect king tide photos from specific locations around the Bay Area. The pictures you take will help scientists better understand which areas are most at risk of flooding and future sea level rise. Researchers will compare your photos of the high tide against computer simulations of flooding to see how well these simulations match reality. This is a fun, easy way for you to provide important information that will help future sea level rise adaptation planning efforts in the Bay Area. For more details, click here

Has your progress in this period brought about any changes to your methods, the integration of intended users, the intended users involved or the project objectives?
No

Have there been any unanticipated challenges, opportunities, or lessons learned?
While not necessarily unanticipated, there are challenges and opportunities presented by the rapidly evolving technology available for use on this project. We are engaged with an ever-growing set of application developers and more examples of decision support tools are made available regularly, so we strike a balance between looking for great examples of things similar to what we are building and making progress internally.

What are your plans for meeting project objectives for the next six months?
The following objectives are scheduled to take place during the next 6 months:

Hold Project Team meetings: Team meetings will be held every other month with webinar capability as needed.

Hold San Francisco Bay Advisory Committee meetings: We will be scheduling our next meeting for May 2014. We will focus this meeting on providing technical assistance updates and convening the members in a focus group format to beta test/evaluate the new SF Bay mapping tool.

Hold Training Webinars for SF Bay Decision Support Tools: We will hold 2 trainings webinars this summer as part of the SF Bay launch. These will include background information on the project, a live demonstration of the online tools, and a question and answer session. We will pursue holding one webinar through the EBM Tools Network again to also reach practitioners on a statewide, national and international level, as well as one locally organized webinar.

In depth technical assistance, feedback, and evaluation of tools: Directed trainings will continue to be scheduled for both the Outer Coast and SF Bay. We will also begin work with Marin County to provide technical assistance for their sea level rise vulnerability assessment, continue work with the SF Bay NERR to evaluate restoration scenarios at China Camp State Park, provide Sonoma Land Trust and San Pablo Bay NWR scenario data specific to the Port of Sonoma and other privately-owned sites and aid in analysis of this data as it pertains to future acquisition or easement; provide Silicon Valley scenarios for use in their climate change planning tool and continue to advise on the development of their web tool, and advise GFNMS on their focal resources vulnerability assessment. We will also synthesis the responses from our user interviews and produce case studies from these discussion and the technical assistance projects outlined above.

Develop flexible framework for web-based DST; revise as needed: Over the next six months we will continue to solicit feedback from the Advisory Committee and through demos and directed trainings, to improve the map interface and overall usability of the decision support tools as needed. We will launch the SF Bay tools in summer 2014.

Predict physical climate change impacts from scenarios: Over the coming six months we plan to: complete king tide and storm event calibrations and validations; complete production runs for storm and SLR scenarios; and generate flood, uncertainty, and duration of flooding maps.

D. Benefit to NERRS and NOAA: List any project-related products, accomplishments, or discoveries that may be of interest to scientists or managers working on similar issues, your peers in the NERRS, or to NOAA. These may include, but are not limited to, workshops, trainings, or webinars; expert speakers; new publications; and new partnerships or key findings related to collaboration or applied science.

During this report period, several team members served as expert speakers at a variety of conferences and meetings:

Psaros presented the project at a Friday night program at the Oakland Museum of California and as part of a "pop up" Exploratorium exhibit, reaching approximately 5,000 attendees. She also organized and delivered a session at the Social Coast Forum in February 2014 titled, "We Built it. Did They Come? Why Decision Support Tools Are Only Part of the Solution to Climate Change Adaptation Planning." In this "Tackle the Issue" session, participants explored:
- How to set realistic expectations with stakeholders about the benefits and limitations of tools, and the inherent uncertainty of underlying models.
- How to design a planning process that best benefits from specific types of tools and at what appropriate junctures they can be utilized.
- How to communicate with tool developers about the needs and workflows of end users, and build these needs into the tool development process.

The session was well-attended and received positive feedback from the tool developers, social scientists, adaptation practitioners, and others in the room. Notes will be made available in early March.

Erikson presented a talk related to the OCOF project at the Coastal Estuarine Research Federation (CERF) Conference in San Diego, CA in November 2013: The use of global climate models, the coastal storm modeling system (CoSMoS), and a user tool for managers to assess the future vulnerability of the California coast.

The utility of OCOF as a Bay Area planning resource was also highlighted by speakers at both the California Coastal Commissions Draft Sea Level Rise Guidance public hearing in December 2013, and at a workshop organized by Congresswoman Jackie Speier, in conjunction with Assemblyman Rich Gordon, and Supervisor Dave Pine, titled, "Meeting the Challenge of Sea Level Rise in San Mateo County," also in December 2013.

E. **Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.**

These have been adequately addressed in other sections of the report.